

which only imperfect material is in existence, some indeed that Mettenius would certainly never have published on such meager data. Mettenius' collection is now incorporated with the general collection of ferns at Berlin, which is next to Kew the most extensive in the world.

Other centers of interesting fern collections in Europe are those of Copenhagen with Liebmann's Mexican species; Munich, with Martius' Brazilian series; Leipzig, with Kunze's collection; and lastly Madrid with the collection of Cavanilles. Before our fern system has been completed all these and the others discussed in this series of papers must be studied comparatively from the standpoint of type specimens.

## OTHER FREAKS OF PEAS

BY IDA CLENDENIN

In the November number of *TORREYA*, Dr. A. J. Grout speaks of the "queer freaks" one comes across in our large city schools in handling the material used by the botany classes. I want to describe one of these that has recently come to my notice, though it may not be so unusual as the one described by Dr. Grout.

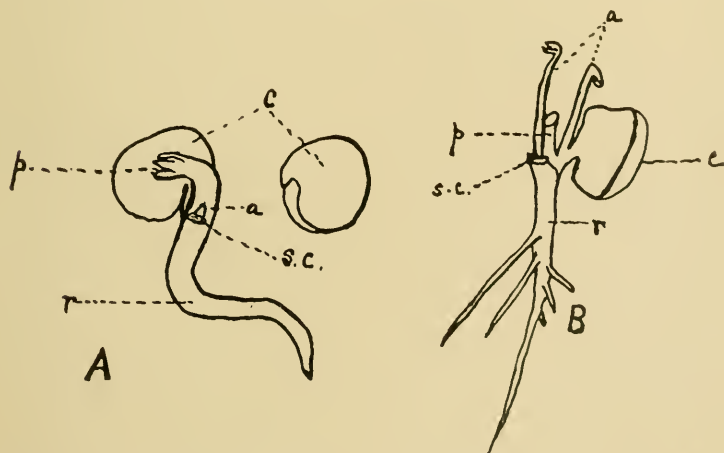


FIG. A. Young seedling, showing bud in axil of cotyledon. *a*, bud in axil of cotyledon; *c*, cotyledon; *p*, plumule; *r*, radicle; *s. c.*, scar of cotyledon.

FIG. B. Young seedling with plumule cut off; shoots from buds in axils of cotyledons.

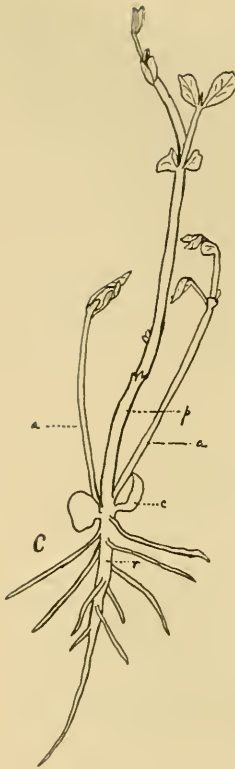


FIG. C. Seedling showing shoots from plumule and from bud in axil of each cotyledon.

In making an experiment last fall to find out the function of the cotyledons of the pea, by placing the radicles of very young seedlings in water, eight or ten girls in my botany classes reported that they had peas with three plumules. When they brought them to class, for inspection, I found that each of these seedlings had the ordinary shoot from the plumule and a shoot from the tiny bud in the axil of each cotyledon. These buds make their appearance at an early stage of germination, whether the peas are germinated in earth or on moist blotting paper, but among the thousands of seedling peas which I have dug up from the germinating boxes in the Girls' High School, I do not remember to have found one in which these buds had developed into shoots except in seedlings whose terminal bud (plumule) had been destroyed. In this emergency, the growth of one or both of these axillary buds is to be expected; I have often induced it by pinching off the plumules of

young seedlings growing with the radicles in water, and it is interesting to note that the shoots from these buds lift themselves in an arch, just as the shoot from the plumule does. So far as my own observations go, the development of shoots from buds in the axils of cotyledons in addition to the shoot from the plumule is rare, and it is difficult to explain why so many seedlings should have shown that tendency the past season.

GIRLS' HIGH SCHOOL, BROOKLYN,  
December 27, 1904.